CLAIMS:

1. An amplifier system having a gain that is variable, comprising:

a variable gain amplifier that provides the gain, having an input impedance that varies with the gain, and

a variable impedance device, operably coupled in parallel with the input impedance of the variable gain amplifier,

wherein

the variable impedance device is configured to provide an impedance that varies in opposition to the input impedance of the variable gain amplifier as the gain is varied.

2. The amplifier system of claim 1, wherein

the variable impedance device includes a first transistor that is configured as a diode.

3. The amplifier system of claim 2, wherein

the variable gain amplifier includes a common emitter amplifier, and

the gain is varied by varying a bias current of the common emitter amplifier.

4. The amplifier system of claim 3, wherein

the variable gain amplifier includes:

a second transistor and third transistor that are configured as a current mirror, and

a variable current source that is configured to provide the bias current to the current mirror.

5. The amplifier system of claim 4, wherein

the variable impedance device includes an other variable current source that is configured to provide a diode bias current for biasing the first transistor, and

the impedance of the variable impedance device is based on the diode bias current

6. The amplifier system of claim 5, wherein

the diode bias current, Id, substantially corresponds to:

$$Id = \frac{M * Ic_{max} - Ic}{\beta};$$

and

M is a constant between 1.0 and 2.0,

Ic_{max} is a maximum value of the bias current, Ic, of the variable gain amplifier, at a peak value of the gain.

7. The amplifier system of claim 1, wherein

the variable gain amplifier includes a common emitter amplifier, and

the gain is varied by varying a bias current of the common emitter amplifier.

8. The amplifier system of claim 1, wherein

the variable gain amplifier includes:

transistors that are configured as a current mirror, and

a variable current source that is configured to provide the bias current to the current mirror.

9. The amplifier system of claim 1, wherein

the variable impedance device includes a variable current source that is configured to provide a bias current that controls the impedance of the variable impedance device.

10. A transmitter having a power output that is variable, comprising:

one or more variable gain amplifiers that provide a variable gain of an input signal to provide the variable power output,

each of the variable gain amplifiers including

an amplifier stage that provides a current that is variable, having an input impedance that varies with the gain, and

a variable impedance device, operably coupled in parallel with the input impedance of the amplifier stage,

wherein

the variable impedance device is configured to provide an impedance that varies in opposition to the input impedance of the amplifier stage as the gain is varied.

11. The transmitter of claim 10, wherein

at least one of the variable impedance devices includes a first transistor that is configured as a diode.

12. The transmitter of claim 11, wherein

at least one of the amplifier stages includes a common emitter amplifier, and

the gain is varied by varying a bias current of the common emitter amplifier.

13. The transmitter of claim 12, wherein

at least one of the amplifier stages further includes:

a second transistor and third transistor that are configured as a current mirror, and

a variable current source that is configured to provide the bias current to the current mirror.

14. The transmitter of claim 13, wherein

the at least one of the variable impedance devices includes an other variable current source that is configured to provide a diode bias current for biasing the first transistor, and

the impedance of the at least one of the variable impedance devices is based on the diode bias current

15. The transmitter of claim 14, wherein

the diode bias current, Id, substantially corresponds to:

$$Id = \frac{M * Ic_{max} - Ic}{\beta};$$

and

β is a gain factor of the third transistor,

M is a constant between 1.0 and 2.0,

Ic_{max} is a maximum value of the bias current, Ic, of the variable gain amplifier, at a peak value of the gain.

16. The transmitter of claim 10, wherein

at least one of the amplifier stages includes a common emitter amplifier, and

the gain is varied by varying a bias current of the common emitter amplifier.

17. The transmitter of claim 10, wherein

at least one of the amplifier stages includes:

transistors that are configured as a current mirror, and

a variable current source that is configured to provide a bias current to the current mirror, the gain being dependent upon the bias current.

18. The transmitter of claim 10, wherein

at least one of the variable impedance devices includes a variable current source that is configured to provide a bias current that controls the impedance of the variable impedance device.

19. The transmitter of claim 10, wherein

at least one of the variable gain amplifiers is driven by an L-C tuned circuit.

A variable-impedance device is placed in parallel with the input to a variable-gain amplifier, and is controlled so as to provide a substantially constant load impedance to a source. Preferably, the variable-impedance device includes a diode with a variable bias current. This diode bias current is adjusted inversely with the amplifier bias current, such that the parallel sum of the two input path impedances remains approximately constant across a wide range of gain. This variable gain amplifier system is particularly well suited for use in a wireless transmitter, or cellular telephone.